[SQUEAKING]

[RUSTLING]

[CLICKING]

ESTHER DUFLO: Hello.

AUDIENCE: Hi.

ESTHER DUFLO: So today and Wednesday, we are going to be talking about health. Of course, this is something that has received heightened attention in the last couple of years for some reason. And I've be talking about-- roughly speaking, I have one lecture on demand and one lecture on supply. Although it's possible that today's lecture runs a little longer, and we'll finish it over Wednesday.

In the demand for health, one could talk about many, many things. But the one thing I want to focus is why people seem to want treatments, like antibiotics and steroid, but not vaccination or the preventive care. Something we are seeing in the context of the COVID vaccine, where it's the same people who want to consume ivermectin and who refuse to get vaccinated. So somehow there seems to be a disconnect between.

So it's not, for example, some people who don't want to get vaccinated against various things are against all sorts of treatment, like Jehovah's Witnesses or Christian Science followers. But the vast majority of people don't want to or are not so excited about getting vaccinated or taking iron pills or doing all sorts of other preventive things but love curative medicine.

That's something that we are, perhaps, are discovering anew in the US, today, with respect to the COVID vaccination or even the flu shot. But it's something that, if you work on development, you've encountered many times.

For example, we have a survey in Udaipur. Very ancient now, but the main factor is still true. It still holds, which shows that the super-poor households in Udaipur spend 8% of their budget on health. And the people spend more. The people are willing to spend like 5,000 rupees on health, on some extreme event, which is much more than what they consume usually. So they are willing to go into debt in order to get antibiotics.

We find that, in that same survey, that these super-poor households have consulted someone for health care episode several times in the last month. They are going to all sorts of people. They are going to traditional healer. They are going to regular allopathic doctor. They are going to quacks, like pharmacists who call themselves doctors. They are quite sophisticated about managing these different sources. Although the models might be whatever it is.

But then, in that same sample, there is a surprisingly low take up for preventive medicine. For example, that same sample of Udaipur, a few years ago less than 5% of children were fully immunized against the basic childhood diseases-- so they had received the five extended medicine.

Another fact which is related to it is super-high price elasticity for technologies that are known to be widely effective-- bed nets, immunization, deworming, et cetera. So looking first at a graph put together by Pascaline Dupas, for a paper in *Science,* that looks at elasticity for positive prices, for all sorts of different goods and different places, from various studies.

And what you see is that, in particular, at very, very low prices, a steep fall in demand. Not necessarily exactly at 0, so it's not necessarily from 0 to another price. At the beginning, this is what people believe, like you have this huge, huge drop at 0. From 0, 60% of people take clorin when it's 0. And it turns to 10% when it's $0.20. But it's not just that. For example, here, you have for bed nets, you have the steep drop a little higher.

What is interesting is that a lot of this falls-- if you exclude these two, a lot of these falls, the levels are relatively comparable even though the things are completely different and they have very different costs. So people are equally elastic for an iron pill that literally costs a few cents as for a bed net that costs many dollars or $7 or $8. And well, they probably would be able to tell you that the cost to deliver the households to them is different. And the value is different, because, from the bed nets, you would get a stream of services over a long time. It's a durable versus a pill that you take just once.

So this doesn't seem true that it could come out of any reasonable model, all of this super-sharp drop of take up at very high-- at very low prices. In addition to the elasticity, the price elasticity being higher for any positive prices, you also have high price elasticity for any negative prices.

So looking at immunization, so, yeah-- So let me get there in a minute. So I'll go back to immunization.

But with the COVID 19 vaccine, you get these tiny incentives. People are given lottery tickets, so that might be big if you win. But your point of winning being so low it's actually a tiny incentive. Or a beer or something like that. Now, I don't know that--

There is, actually, at least one study, from the Netherlands, on the impact of incentive, showing that these incentives seem to have a very large-- reasonably large effect. I'll show evidence of impact of incentives on immunization in a moment.

But, certainly, there is a widespread belief that these small incentives move behavior. So you can think of them as a price-- as a negative price that you give to people. So it's symmetric around 0. You pay people a little bit to do something, and then they do it in a large part.

So there are two counter-arguments to this idea that people are very price elastic. One is that, well, maybe people are not so price elastic. But if you offer things for 0, a bunch of people who have no interest in the thing are going to get it anyway. Because at 0, your valuation is always going to be a little bit higher than 0. Even if, for example, even potentially to do something else with it.

So for example, with bed nets, there was this idea that people would take the bed nets, not because they are interested in the bed nets, but because they could use it for something else. They could use it as a piece of cloth. So you could make a fishing net out of it or something like that.

So in that case, when you give things for free as opposed to putting a small cost, then you draw in a lot of people. But you don't draw in people who are interested in health. You are drawing in people who are-- because, even if you have no interest in the health, you might have another interest in that thing. That is just big enough that for 0, you would take it. So in that case, there would be no mystery. It's just that there is just a bunch of people who are not interested but, at 0, would come in just in case.

So there is actually several people that look at that. And the test, there, is whether, once people, for example, acquire a bed net, do they use it? Or in Ashraf-Berry-Shapiro, another device-- this thing, it's water treatment. Once you get the water treatment, are you actually putting it in the water?

So if your valuation of the bed nets for the goal of-- for the purpose of health is 0, then you're not going to use it as a bed net once you get it for free. In addition, there is another argument people make, which is the very fact that you paid 0 for a good makes you think it's worthless, so there might be some behavioral thing on top of it. That would also mean that if you don't pay for a good, it also reduces your valuation of that good as a health good.

The two combined have the prediction that if, in fact, the real elasticity is lower but there are just a lot of people who are not interested, we should find that people who get a good for free are less likely to use it. So the first paper to test that was Cohen and Pascaline Dupas and Jessica Cohen, who did a fast study distributing free bed nets or bed nets at some prices along with the first maternity checkups. And what they did, later, is that they did random checks to see whether the people were used at follow-up.

And what they find is that, conditional on having a net, so including both the treatment effect, potentially, as well as the selection effect, which is what we are interested in today, the use of the bed nets actually is the same regardless of the prices you get, you pay. Now, of course it's conditional on getting a net. But since you are much more likely to have a net if it was for free, the effective coverage by a net is, in fact, highly price elastic, the same way that I was showing you before.

So if I showed you the effective coverage, which is the probability to have a net multiplied by the probability to use it, this is, in fact, highly dependent on how much people need to pay. And even at 50 Kenyan shillings per net, we are now at 1/3 of the or 1/6 of the full price. So it's still much, much lower than the full price. Nobody is willing to pay any more. So that price elasticity seems real for the use of a bed net.

They also make-- So likewise, as I was saying, a large reaction to small positive incentives for immunization, such as the ones that are proposed for the COVID 19 vaccine. The first study I know about is a paper that Abhijit, Rachel Glennerster, Dhruva Kothari, and myself worked on in Udaipur, the same area where we did the survey. We were really struck by this 5% full immunization rate and wanted to do something about it.

So we did what Dean Karlan has called "conditional lentil transfer," instead of "conditional cash transfer." So we did a small experiment in 130 villages. 60 got randomly assigned to receive regular immunization camp. And so that's already a big improvement over what they had normally.

Because, normally, they were supposed to go, this time, to the health clinic, which was closed a lot of the time. And so maybe it's just hard for them to get immunized. Because you show up with your kid. Walk two kilometer. Show up with your kid. The nurse is not there. Maybe you're not going to do it, again. Actually maybe it was, in fact, extraordinarily expensive.

So the first thing we wanted to do is to sort of simulate what would happen if the camps were really ultra regular. Would it be sufficient to bring everyone to immunization camp? So again, in the COVID 19 vaccine, questions have been raised, in particular, for people from minorities, around access and making it as simple as possible.

So here, suppose we make it as simple and regular as possible. So the NGO we work with, Seva Mandir, made an agreement with the government of Rajasthan to take over immunization services in 60 villages. They hired a nurse. They were there every month, rain or shine. All of the camps were held. They were in a central location in the village. So make it quite easy.

Then in half of those, we offered small incentives to get immunized. And the small incentive was a kilo of lentil per shot plus one set of plates for finishing the shot. So it's actually-- there's kind of a slope to it. It's convex, which is going to be relevant for the rest of what we're going to do today.

And we found pretty large impact. Oops. This is immunization in the control hamlets. So at the end line, they were at 6%. In intervention A hamlet, that's the ones that just got the camps, so that's already about doubling to about 12%. And then in dimension B hamlet, when we added the incentive, it comes to about 37%.

So in fact, that draws in so many kids that it is cheaper-- To get the kid fully immunized, it turns out to be cheaper to offer the incentive than not offer the incentive. Because the nurse was more occupied. So the cost per shot goes down. The full cost increases, but you have more kids. But it means even counting the transfer of the costs, it's actually cheaper to provide incentive than not to provide them in this case.

It has to be a function of not very many people getting immunized without the incentive and the large treatment effect. Furthermore, we find very little spillover to the neighboring villages of just having the camp. So people do not seem to be walking nearby in order to get immunized. On the other hand, we find spillovers when the incentive is there. So this bar is bigger than this one, for example.

So showing that people will not move to get immunized, but they'll come for the kilo of lentils. So that suggests that maybe the COVID vaccine incentives might work. But there is, however, one big difference in the context, which is where we ask people in Udaipur whether they think immunization is a good thing. They all think it's great. And they all would like to do it. So 98% of people-- and we did the same survey in Haryana. You read the [INAUDIBLE] paper, where we did the immunization context.

In this context, everybody tells you that they would really like to have their kids immunized. So when people have asked me about the incentives for the COVID vaccine, I was like, well, there are some people who might want to do it and don't get around to do it. And then the incentive might work. But it is less clear that someone might be convinced by a small incentive if they don't want it in the first place. So that creates a very different context.

And that's why we have to think about what causes these very large responses to the incentives. So why are this? Why are those? These are just a few examples. But there are many others.

Rebecca Thornton has a paper on giving people incentives, tiny incentives, to get their HIV test results after the test had already been taken anyway. So it doesn't even involve the shots. It just getting the results-- and find very large impact of getting a small incentive to collect your HIV/AIDS test results.

She also finds that, if the tent to collect the result is a little further away, people don't go. So in a sense, in the same paper, she has a response to the negative-- the cost of having to travel, the walking cost versus the cost of the small incentive, and find the same thing in both paper. So these are just two example. But there are many, many others.

And now, in particular, there are replication of this small incentive for immunization in many contexts, most recently in Pakistan, in a paper in which I was involved, but also in Ethiopia and in other places. And it's the basis for the conditional cash transfer approach, which has become very popular in many countries. But of course, those cash transfers are much larger.

So although it's very popular, it's pretty puzzling in light of a demand for health model where people are responsive to benefits and responsive to costs. Because the benefits to preventive health are fairly large-- are very large. And that's why I was pointing out that, OK, are people aware of these benefits? Maybe they are not.

In the case of the immunization, in the US, maybe the remaining people, who are not vaccinated, are not aware of the benefits. Or for them, these benefits are balanced by very large costs. But in the case of Rajasthan or Haryana, it seems that people are aware of the benefits to some extent. At least they are aware enough that they are willing to tell you that there are such benefits.

By the way, I don't know what their-- The answer about COVID vaccines are different. There is also a great amount of hesitancy for COVID vaccine, in India, that you don't see for childhood vaccination. And that I don't know whether it's because it's the first adult vaccine that they have, since there are no regular flu shot vaccine. So it's something unusual. Or whether it is because the same kind of disinformation that floats in the US somehow makes its way in all of these countries, as well. I don't think we know that yet.

But in the case of childhood vaccination, or maybe they just-- we'll talk a bit about social norms in a minute. Maybe if people feel that you want them to hear that the childhood vaccination is safe and effective, and they should do it. So that's what they tell you. But they think it's OK to say that the vaccines for COVID are not safe, because that's what everybody around them is saying. It's possible that it's the case, as well.

So all of these goods have large benefits. People seem to care about their health, since they are spending so much money on treatment. It's not that they care, in particular. They won't immunize their kids for measles. But if the kid has measles, they will spend tons of money trying to get them better. And the prices or the opportunity costs are not that high to begin with. A lot of these goods are heavily subsidized or they are free, and all you have to do is to spend some time-- take some time off to get the kid vaccinated.

So what are the possible explanations? So one of the most popular explanation in economics is present bias. So if you remember the model we just saw for savings. People might have very different preference in the present and in the future.

So here, in the case of immunization, think of being immunized, that's something you value in the future, and the time that you spent in front of the television, instead of getting immunized, as a temptation good. So it's in the space of time or inconvenience as opposed to being in the space of money. So you think that you would like--

So today, you think about the benefits of immunization. In the future, they look good. But you don't experience any today, because today your kid is not exposed to the measles. Or today, your kid is not-- there is not any benefit today. There'll be benefits in the future. But the temptation of staying home is today. The temptation of using some of your time is today. And you don't value that time for tomorrow. So you will always want to wait and do it some other time.

So in that case, a small cost today discouraged actions. But it could be undone by a small benefit today, for example, the bag of lentils or the plates. And that would give you an argument for preventive care subsidies, not just positive prices but also subsidies, not just because of externalities reason, which, in and of itself, would justify that we pay household to get immunized, so they internalize the benefits to other people in the community.

But also for internalities, because the small benefit received today is going to outweigh the small cost of today. And at some level, you should give ice cream in the camps as opposed to money in this context. Because you'd have a temptation against your temptation, and that would be great. So in that sense, the beer might be the ideal form of an incentive.

If indeed present bias was a big reason why people don't get immunized, then incentives would not be the only way that you could go about it. For example, one thing that would be powerful is default option, which is, basically, you have to opt out to not get your kid immunized.

So the form of mandates that are present for childhood immunization in many countries including the US. It's not that you cannot refuse to get your child immunized, but, if you do, it's going to be inconvenient. You have to find a doctor that is willing to sign you a form. Or you have to find a religious leader who is going to give you the religious exemption. And so that's a bit of a pain.

So that can be interpreted in this framework by saying, well, by default, your kid is going to be immunized for all of these diseases. And if you want to get out of the default, you have to do something slightly painful. So that's this idea of nudge or choice infrastructure is that the default is going to push you in that direction. Not just because it shows you what to do, which might also be part of the impact of default, by the way, but also because it sets up a barrier.

So that's why in most-- for childhood immunization, I think, in most of the developed countries, we don't have incentives. We have mandates that are not very hard mandates. We can see that, in the case of the COVID 19 vaccine, the mandates are actually much harder. And they are now only for adults. But in places like, for example, if you are a health care worker, you'd lose your job.

So that's not a nudge. So it's a different kind of mandate. And they don't give-- at least in, for example, my pediatrician's office, there is a big placard saying, we are not giving medical exemption for the COVID 19 vaccine. So I think they are making-- partly, because the reason why people are refusing COVID 19 vaccines are different. They are a refusal not an inertia, not this present bias framework. Then if you want your mandate to be effective, it's actually a proper mandate.

But for childhood immunization, if the issue is really hyperbolic discounting issues, that you want to do it, but it's kind of never quite the right time, then a default option would help.

Another thing that might help is to help people to commit. So in the same way that, for the savings, we saw Ashraf, Karlan, and Gine looking at giving people a commitment savings option. Dean Karlan and Xavier Gine have a paper in the Philippine, where they offer a program called CARES-- not to be confused with the unemployment relief in the US-- where people are offered this incredibly attractive savings account, which is an account that pays 0 interest, where you agree, if you put the money, to submit yourself to a smoking test. And if you fail the smoking test, you lose the money.

So that incredibly attractive product should really be taken by no one, unless they are very keen to stop smoking, because you might fail the test. In fact, 10% of people take up the program when they are offered. So it's not everyone. But it's comparable to the take up of smoking cessation offers, when they are made in the US, for example. And of the people who were offered the program, they were 3% more likely to stop smoking than people who were not offered the program.

So assuming that being offered the program doesn't have a direct effect, and, therefore, we can use the offer of the program as an instrument for stopping smoking. And now, I'll let you, as homework, think about whether that's a good assumption or not. But if you are willing to assume it, that gives you a treatment effect of being actually signed up of 33%, then divided by 3, which is a pretty large account.

So the fact that anybody is willing to do that, and, of those people, there was actually some success involved is also consistent with these commitment problems. And of course, the paper on alcohol, that you saw with Frank, again goes in this direction.

I do have one misgiving with this type of commitment-based, commitment problem, time inconsistency problem based explanation for preventive health, in particular vaccination, which is that it really requires people to keep being fooled by themselves. You have to think, I'm not going to do it today. But I value it, and I'm going to do it tomorrow. But then when tomorrow rolls along, you again not do it.

And take for example, the example of our immunization camp. Every single month there is an immunization camp. Every single month, they fail to go. I mean, after a while, they should have gotten the memo and figured something out. And at the same time, we're saying people are sophisticated enough to sign up for commitment devices. Well, then I have trouble thinking they are not sophisticated--

If they can sign up for a CARES commitment device to stop smoking-- of course, these are different households. But in the context of Udaipur, we could find, I'm sure, a lot of evidence showing a certain degree of sophistication. Then how could they continue not going, month after month after month, till the kid finally gets measles? That doesn't-- it's kind of hard. If they really understand the benefit, the huge benefit that we think they are, then it seems a little bit unlikely. Do you see my point? So even though I--

So this type of explanation, that intuitively is very sensible and a lot of pieces of evidence kind of gel, but, quantitatively, it makes no sense at some level. And I haven't given you a quantitative calibration. But I've made one in my head for you. Like somehow it goes in the right direction, but it doesn't pass. So that's my issue-- as long as the benefits are in fact as large as possible.

So one other possibility is that people are just not informed. So one of the thing is that these huge benefits, they exist. They are not balanced by huge cost. By the way, another explanation for low take-up would be people are scared or there are huge costs associated with it. But in that case, they wouldn't be swayed by small incentives. Right, this is the discussion we had on the COVID vaccine. You have to have a real mandate to move people who really don't want to do it. Because they think there is a big cost. Yeah?

AUDIENCE: On the last point you made, in most of these types of experiments and things, are these camps things that are going to happen in one month in the village and not come back for several years? Or is it a situation where vaccination camp will happen month after month or year after year and just this one happens to be run by Seva Mandir and has an incentive? I'm just what is that outside option if I don't take up one of these?

ESTHER DUFLO: Oh. So in this case, I think they could have expected Seva Mandir to continue to do-- to run the camps.

AUDIENCE: Yeah.

ESTHER DUFLO: Because it was not done as an experiment. So from their point of view. It's a program by Seva Mandir. In fact, as far as I know, they are still running those camps. 20 years later, they are still--

AUDIENCE: The reason I ask is, is there anything in the [INAUDIBLE] theory that you're saying is [INAUDIBLE], that has to do with that outside option?

ESTHER DUFLO: Yeah. Yeah, so that's a good point, which is something that I think-- and [INAUDIBLE] suggested what we do is to have a deadline and to say, if you want to get your kids immunized at the camp, in this village, that's this month. And then after that, we are not coming back. So this is without deadline. So this is just-- this would-- Yes?

AUDIENCE: And couldn't it be the case that people are not getting this preventive health because they don't have time for it. In Chile, one of the biggest issues with the COVID vaccine is that vaccination camps were open when people were working. So they had no permission from their bosses to leave work and get vaccinated. Because, otherwise, they would get fired. So they didn't get vaccinations, because there wasn't the right amount of time during the day to do that.

ESTHER DUFLO: Yes. So here, it's going to take them some time. A lot of these people, particularly the moms are. And it's not that they're working somewhere, but they are very busy. They have stuff to do. So you need to take some time off. So think of that as the opportunity cost.

The description you are giving in Chile is super-high opportunity cost. But I think these people have quite low opportunity cost. And that's low opportunity cost, including-- plus the fact that the kids might-- they get a bit sick and all of that. Those are the costs you're going to experience today in exchange of a benefit-- a flow of benefits in the future. And then these are not very big costs, so we can out compensate them, balance them out with the small benefit. But in your example, for Chile, if the cost happened to be large then--

AUDIENCE: They even had to write a law that said that if you get fired by the boss, because you want to get a COVID vaccine, then they're going to sue that firm.

ESTHER DUFLO: And so should they. This is a-- yes. So, yeah, there might be situations-- That's also what they were saying at the beginning of the vaccine here. Some people had real issues with access. And in India--

So I don't want to belittle the access issue. In India, for childhood vaccination, for years, this was the only thing the government was trying to do is to really improve the access. And it has improved. It's much better than it was. And the vaccination take-up is still low. So it's not the only part of it.

So one possibility is that people-- it's not that there are huge benefits and then huge costs, but that the benefits-- the cost are low and also the benefits are low-- not the real one but the perceived one. And in fact, there is plenty of evidence that people do not-- that there is a lot of relevant pieces of information people don't have. And so they might not realize what are the benefits associated with a particular behavior.

So for example, I mentioned HIV education in Kenya, which is insisting on this ABCD program, Abstain, Be faithful, use a Condom or you Die. And it's not-- that program doesn't have one key piece of information, which is that the rate of getting HIV is much higher.

The rate of being contaminated by HIV is much higher for older men than for younger boys. As it would be, since it doesn't go away. Once you're contaminated, you're contaminated. And also because older men, in fact, have risky sexual behavior, often have many girls that they pay for sex and so on and so forth. So they are called sugar daddies.

So Pascaline Dupas, for her job market paper, did an experiment where she just gave girls and boys a piece of information that the rate of HIV is much higher. Just it was basically giving them information on rate of HIV positivity in Kenya among older men, younger boys, and then, also, women. And by the way, one other thing you find is girls are more likely to be contaminated, which is something they didn't know. So that is something that kids did not know.

And then the way she looked at the impact is by looking at pregnancy. Because HIV is rare and hard to test. But pregnancy is a pretty good indication of risky sexual behavior. And she finds a decline in pregnancy of 31%. It's not that they had 100 pregnancy but it's normalized to 100 for some reason. So it's normal at a 100, and then 31 of this 100 were averted. So it's a pretty large impact of one piece of information that people didn't have. So one possibility is that somehow the information doesn't go to-- people don't know the impact.

And another paper by Pascaline also pushes this information thing, information exploration by looking at what happens if people get a first bed net for free or the first offer of a bed net for free, they are more likely to actually get a bed net than people who got an offer and were asked to pay something.

So this is not from the first experiment I showed you. This is from a second paper where she randomized, at the individual level, by giving people vouchers to buy bed nets. So in the first study, it was done in the health clinic and randomized at the health clinic level. This one, it was done in just distributing people voucher and said, you can buy yourself a long lasting net, either for free or by paying something. And the full price is about 500 or 600 shillings, so it goes-- the subsidies were about from 50% to 100%.

And you find the same results that we already saw several times today, which is people are less likely to get a net if they have to pay for it. But then what is interesting is that she looked at-- she went back to this paper six months later. And she asked them, if they wanted to buy a net at a price that were-- I think it was somewhere in the middle-- at the price of 150 shillings, so kind of the mid-range price.

So in the second period, everyone is offered the same discount. And then what we show in this-- what she shows in this graph is depending on the offer they got in the first period, are they more likely to get the second net?

And what you find is people who got it for free or for very little money are more likely to purchase a net than people who were offered the net at some price, which, in a sense, is pretty striking. Because they already have one. So for them, that's a second net. So the marginal benefit of a second net should be lower than the marginal benefits of a first net. And despite that, they are more likely to get one.

This, by the way, again, goes against another argument of the people who think that we should always make people pay for things. Which is that people get used to handouts. And once you make people pay for something, they refuse to pay for anything else. And what this graph shows is that, instead, people get used to nets rather than getting used to hand outs.

So it could be learning. It could be habit formation, as well. So the sleeping under a net is a little painful. You have to set it up. It's a little bit hot inside. And so it has to become part of your routine. So one possibility also is, just by having your first net, you got into this habit of using the net. And therefore, you continue.

So if you wanted to separate the fact that you provide an incentive for behavior, for a while, and then it goes away and people continue, it can be interpreted either as learning about the benefits or the costs of this technology, saying, actually, it's not that hard to sleep under a net or it's really super-cool not to have mosquitos or my kid didn't get malaria for the whole six months. So this is really great. That's the scale in favor of the explanation. Or it could be a habit formation, which is it becomes less costly to you as you are getting used to it.

So there is a paper that I'm not going to go through in detail, now, by Reshmaan Hussam, who looks at trying to build up a habit for hand washing, where she showed that-- where she tries to set up tests that can allow you to distinguish between these two explanations in the case of hand washing. Yep?

AUDIENCE: What does it actually take to set up a bed net? What are the actual steps to setting it up?

ESTHER DUFLO: How long does it take to set up a bed net?

AUDIENCE: Yeah.

ESTHER DUFLO: Well, depending how you said set it up in your house. So typically, people attach it to a hook on their roof. Once it's attached to the hook on their roof, it's really not much. You have to unfold it every evening. So it's a few minutes. And then so if you do that, if you hook it properly and put it, it's really not that bad.

AUDIENCE: So if you have two nets, once you are operating and it crosses [INAUDIBLE] one net, the second one would take a shorter amount of time relative to the first one.

ESTHER DUFLO: I would say it would be similar. Because you would put it elsewhere in your house. And you put a second hook. But yeah, you also would have known how to use it or would have learned how to do it, efficiently, in a way that works for you. Yeah?

AUDIENCE: This can be shown having been offered a net for free not having used?

ESTHER DUFLO: Its conditional of them being offered the net for free and not even having it. So these guys are more likely to have-- these guys are much more likely to have one. And of the people who have one, most people use it, in fact, regardless of how much they've paid for it. And it's not conditional on that. So those guys are actually more likely to have one and be using it.

AUDIENCE: Could there be like a deadline story, something similar to a deadline story, where by having gotten an offer at $0 and then seeing the difference in the price increase, you might forecast the next option I have to buy a net is going to be 100% whereas--

ESTHER DUFLO: Oh, that's right, you might forecast inflation in bed net prices and saying, this is my last option. That's totally possible. That's a good point. Saying if you forecast inflation, you're just going to buy now. They are true. But this good deal is definitely going away. That's good. I had not thought of that. That's a good idea.

So these two-- just again, two pieces of evidence that suggest that there is a lot of things people don't know and when they learn, they actually adjust their behavior. And the other problem we have is that learning about health is really difficult. In particular, learning about preventive health and the difference between curative and preventive health is very difficult.

So there is a very nice paper by Jishnu Das and Monica Sanchez, where what they are looking at is curative care. And again, this could be a model of information and why ivermectin became a drug of choice in the case of COVID, even if, in fact, it doesn't work.

Assuming that, in fact, it doesn't work, why could people think that it works even when it doesn't work? Well, it's because COVID is like the flu. For a lot of people, it's self-limiting. That means that a lot of people will get better, regardless. And so they take ivermectin or pink Gatorade, and then they get better. And then they can very easily attribute the fact of getting better to ivermectin or to pink Gatorade.

So in the case of India, and it's same thing in many countries in Africa, people overuse antibiotic and in very creative way. So for example, people will prescribe you one short course, what they call a short course of antibiotic, which is like one pill.

You take antibiotic once, that doesn't help you. In fact, that doesn't help you. It creates resistance. It hurts everyone else. But you'll feel better if what you had was self-limiting. And then you think, well, that was great. This one shot-- preferably a shot, an actual shot. This one shot of antibiotic had a great effect on me. So next time I'm sick, I'm going to do this again. And if you do that again, a few times, every time you confirm your opinion that it really works out very nicely.

So learning about doctor quality is really hard and especially if it is hard for people to think about a model where you do nothing and you got better. You don't attribute it to doing nothing.

Whereas, if you do something and you get better, and especially if someone has told you, has given you the causal model saying, I'm doing this and you will get better. And in fact, you get better, then it's hard to-- So the kind of fake snake oil-type medicine are more likely to take hold with medicines that have either this fluctuating tendency or are self-limiting.

Now, with preventive care, trying to understand the benefits of preventive care is really difficult. Because you do something and nothing happens. And then if the vaccine works and protects you, you don't get COVID or you don't get measles. At least there are a lot of COVID. So if you're the one vaccinated person in a group of unvaccinated people, and you don't get it when everyone else gets it, maybe you learn something. But even there, it's harder. But measles is too frequent and kids die from it, but it's not that frequent. And so you might never really get an opportunity to experience it.

And it's particularly difficult to link cause and effect in the cases like immunization, which is contagious. So for example, in the case of deworming, if everybody around you is dewormed, you won't get worms regardless of whether you're dewormed or not.

So trying to understand the mother and whether this deworming medicine works, and you're comparing yourself, who hasn't taken it, to everyone else who has taken it, you're saying this thing is really not what it's made out to be. And the way that the benefits were sold to me were oversold.

So in some sense, every time we try to explain the benefit of a vaccine to people, we are overselling it to them. Because we are trying to say this is the benefits this. Your private benefits are going to be huge. But it could be that the private benefits are huge in a way that is impossible to assess for people.

So that would explain why, without anything else, the standard information story would make people quite skeptical of the benefits and, therefore, more indifferent than we think they ought to be and, therefore, removing the puzzle, in a sense. And so, now, if they are mostly indifferent, then we can reinterpret. We can go back-- going back to a little bit of time inconsistency on top of a huge zone of indifference, anyways, will create a large number of people whose behavior will look very inert. And then the puzzle somehow just disappears.

On top of it, in this context, where forming your own models of the world is really hard, because you don't have the right data, and it's complicated and all that, you would imagine this is the place where trust would be the most important word you have to have. If you cannot make up the story yourself, you have to have trusted the person who is telling you to do it.

Frankly, I have no real understanding of how mRNA vaccines work. And I have no reason to do it, from my own experience, whether this will implant a chip in my head that is going to make me an agent of the CIA. But I trust the people, the system, et cetera, to both reassure me that they in fact work and the randomized controlled trial have been done properly and so on and so forth, and that they don't have those side effects.

But if you don't-- And so this is where the trust in the government plays a key role, and our trust in official sources, the government, the nurses, the doctors, et cetera. But both in OECD countries and in developing countries, there has been a huge decline in the trust of government over the last 10, 20 years. In the US, it's at an extremely low level. So it is not entirely surprising that people cannot get the whole story of the benefits, because they don't understand the mechanism, as they shouldn't be expected to. And they don't trust the messengers.

In developing countries, this mistrust in health services has, in many cases, some roots, because some public health campaigns have been botched or some people have been using public health campaigns to do other things than what they should be doing.

So going back to our friend, ABCD, or the ABCD campaign against HIV, quite explicitly, the government people will tell you that it's not just about HIV. But in addition, if kids were less promiscuous, it would have a lot of good side effects. We wouldn't have early pregnancies and all that. So we might as well scare them to death on HIV. And, therefore, we'll get these things, as well.

So we know, of course, that using a condom would be good enough. You don't need to abstain. We know that if they had a sexual relationship only among themselves, it would be much safer for HIV. But we are not going to tell them, because, well, we might as well get them to behave.

So this is just as an example of this. It's not necessarily sinister motives, but there is always a tendency of slightly-- or misusing your power, information power over other people that you are supposed to instruct. Because, well then, you might as well get some benefits.

This mistrust in the health system has a huge impact in people believing things like COVID vaccines but also childhood vaccinations. For example, in India, there has been-- during the emergency period in the late '70s, when Mrs. Gandhi was in power, there was a huge campaign of forced sterilization. And it was disguised in many ways. And people were sent to camps. And people remember that.

And so I've long believed-- although I still haven't seen the study yet, I have long believed that the forced sterilization, that in areas where you have more forced sterilization, there is more mistrust in the health system today and, therefore, less take-up of services. So although this is a study I've always wanted to do, and I've never seen a good version of it, although I've seen some not so good version of it.

For India, there is one paper that comes very, very close to it, which is a paper by Sara Lowes and Montero, where they look at Cameroon, which used to be separated between France and England during the colonial period and is now one country. And the French and the British had different ideas on different things.

And in particular, at some point, the French got super worried about sleeping sickness. And they undertook a massive campaign against sleeping sickness. So they vaccinated everyone. And the vaccine was not that good, and a lot of kids died. And it was just a bad idea. And those places still have low trust in medicine today compared to comparable places in the same countries that were under British rule and that did not receive the same vaccination. So that's an example of long shadow of mistrust.

Another example from the US is Marcella Alsan and Marianne Wanamaker study on the Tuskegee trials, where places that are closer to Tuskegee County, that are closer to Tuskegee have less trust in government today. But this is exactly the idea.

Tuskegee was awful. And this was just misguided. If you see the-- This Tuskegee was actual bad behavior-- people lying, et cetera. This is just they were trying to do a public health campaign, and it turns out their product was not great. And this is still-- kids today are less vaccinated in those places compared to very, very close by places, which were under British rule.

Another paper along the same line, still on vaccination, is a paper, by Monica Martinez-Bravo and Andreas Stegmann, looking at the CIA vaccine ruse. So when the Americans wanted to get Bin Laden, they needed to collect information about, I think, the DNA of his kids. And they send a guy to do some vaccination campaign in Pakistan, where he was hiding, in order to collect swabs, to have swabs of the kids, so they could find out that it was in fact him.

They found him. Whatever. They killed him. And after that, if you look at the places where that happened, there is less vaccination today than in other places. So that's another example. So this mistrust in the government--

And therefore, contrary to the impact of very well-targeted pieces of information, for example, how costly it is to use a net or older men are more likely to be HIV positive than younger men, you have a low impact of general kind of "trust me, you should do this," without any concrete pieces of information attached to them.

So in our study of the ABCD campaign, we find no impact of the ABCD campaign on behavior. In the same setting, where Pascaline find large effect of that more concrete piece of information. And also in Kenya, Kremer and Miguel, along with a deworming program, have a campaign where they're trying to tell people, kids, don't walk barefoot, don't go fishing in the lake. And then that has zero impact. That's because it doesn't have a new information. It's just some general preaching message. And that is not effective. So that's the trust part.

So now if we are in this kind of setting, then you would imagine that the social norm, the social equilibrium would play a pretty important role, first of all, because it can substitute or, on the contrary, annihilate whatever trust exists in the system if a community agrees to a common behavior. Second of all, because-- since people understand-- if people understand that the benefits to immunization is mainly social, then whether or not there is a social sanction or social reward associated with taking a social action can create the benefits.

Now people see that, OK, I'm mainly doing this for the community, as far as I can understand. Is the community going to be grateful to me and going to manifest this gratefulness or not? So one way in which you could help the community reward people, who are doing the right thing for the community, is by helping people signal that they are the "right kind" of people.

So when you go to vote, you get a "I voted" sticker. When people get vaccinated, sometimes, also, they get sticker. I don't if you got "I got vaccinated" stickers. I didn't get one. In France, they don't give you one. But for example, when doctors get-- also in France, when a health worker get vaccinated for the flu, they get a badge saying "I'm vaccinated. That's to protect you--" that kind of things.

So Anne Karing did a very nice experiment. It was a job market paper, by the way, so it's worth reading it in order to get a sense of what you could do as a student. She said let's try and help people signal that they are the type of people who immunize their kids, either because they're good parents or because they are good for the community.

So they give silicon bracelet to show that you have completed the sequence of immunization. She randomized that at the village level. And she found-- or the health center level. And she finds that, in places where the bracelets were given at the end of the sequence, bracelets were very popular, and they do increase immunization.

Now, one question for you. How do you-- how does she know? How do you know that it's signaling, per se, that you're a good person? And what else could it be? Yeah?

AUDIENCE: You want to make sure that-- if these are a form of verifying that he's actually been immunized, whereas, relative to before, there's no way of verifying it, so that businesses couldn't act on it. If you want to make sure that business aren't [INAUDIBLE]

ESTHER DUFLO: Yeah. So you would see-- so here, by the way, it's not just businesses. It's like basically people around. It's not that people use that, like we use it in France to go anywhere. But it's a way of saying-- well, in her mind, it's a way of showing you've been immunized, to your friend and everything.

And as you say, well, the point is, how do you know that people understand that it's, in fact, signaling that it's, in fact, a verification for that. And if it's not, why would people-- why would you, anyway, see potentially an impact of the bracelets? Yeah.

AUDIENCE: People just like getting bracelets.

ESTHER DUFLO: Yeah. Maybe people just like the bracelets. So you think, well, it's really tiny. But remember, people went and got vaccinated for a kilo of lentils. And a silicone bracelet is more fun than a-- for your kid is more fun than a kilo of lentils. So people might just like it, right.

So what she does to test that? And that's a nice feature of the experiment is that she introduced a treatment, which is uninformative bracelets, where everybody gets a bracelet, anyways. And then you can compare the uninformative bracelets to the informative bracelets that you get after having completing the sequence.

And in fact, although it's not quite how the paper is written, but if you look at the table, in fact, the uninformative bracelet-- so that's the part where, I think, she got maybe very happy with her results, and she wanted to--

But if you look at the table, the uninformative results are about as effective as the informative bracelets. So one way to read this is that you can't really reject that people just like bracelets, and that it's not the signal that works out. But it was super-well designed to figure it out. And now she's doing another one on deworming, where maybe we'll find more of a difference between signaling.

So with many of these explanations, the information, trust, conveying the social norms, the social networks are likely to play a key role. So the idea then is how do you activate the social network, in the case of immunization or preventive good, to your benefits?

And of course, the common idea is to activate it via people who are influential in the network. And in the COVID 19 people, it was done both by trying to activate stars and by trying to activate more locally influential people, like church leader, community leader, et cetera.

So starting with stars, Vivi Alatas, Ben Olken, [INAUDIBLE] and a bunch of other people on this paper, other paper on the role of stars in promoting vaccination messages-- again, childhood vaccination messages. And what they do is that they use local stars, so that they have geographical differences and randomize at that level.

There are many stars, which are on there, different kind of groups of people on Twitter, either write in their own voice or just retweet the messages by WHO. And what they find is that the most effective is when a star writes in their own voice. "I am so glad that my kid got immunized." Or "I think immunization is important, or something like that. And those messages are much more likely to be liked and to be retweeted and so on and so forth.

We don't know-- they don't have-- They can't test immunization status, unfortunately. So it's all about that communication by star on vaccines get powerful. Abhijit, and the same, Ben, Rema, Arun, have a paper that Larry Katz called the Banerjee effect, which we did in May of 2020 at the very beginning of the COVID 19 pandemic.

We had Abhijit, who at the time was a star for tourism in West Bengal, first, because of the Nobel Prize. In India, they take their Nobel prizes seriously. So he's like literally on billboards and magazines and all that. It's something crazy, actually. When he goes to India, when he arrives at the airport in Kolkata, they are like people thronging. And he has to be put in a police car and all that. If I go to India with him, I say, let him go, and, with the kids, we go some other way. Say, we don't know that guy.

Anyway, so we try and put it to good use. And another reason why he was potentially famous, relevantly famous in this context. Is because he was-- still is, actually-- the FAO chief for West Bengal, without the medical expertise. He is the chairman of the COVID 19 prevention commission.

So he recorded short videos. And they were sent to people via SMS. It was randomized at the geographical level to about 20 million people in West Bengal-- randomized at the zip code, equivalent of the zip code level. And the videos? So we tried different variation in the message. And we also-- And the main outcome was-- so

But all of the message encouraged people to practice social distancing and to report symptoms to the ASHA, to the local health worker. And then we looked at whether the ASHA reported that anyone reported symptoms to her, in the first few days after the messages were sent, and, therefore, we could be sure it's not that we increased COVID 19 prevalence with this message and, therefore, more symptoms were there to be reported.

Anyway, what we found is a doubling of rate at which symptoms were reported to the ASHA, as well as more self-reported social distancing of various kinds. Which doesn't seem to come from information, because people receive about 20 messages a day, anyways, and seem to be pretty well informed, but more about an extra nudge of doing the work.

So it does seem that these stars, public figures have, potentially, an impact. The idea of the Biden immunization corps was to use locally influential people. And this is something which you find a lot of in developing countries, where you try to-- Whatever, when you have something to sell-- a public health campaign or a new product-- you try and identify, in the community, people that are influential.

So the problem is, who is influential? And the way that-- the traditional way to get at that is you know in advance. So for example, in the case of the micro-credit organization that you write for the paper, you write on gossips. You could think it is the people who are the shopkeeper, the teachers, the self-help group members, et cetera, the religious leaders-- are the ones that were used by the Biden campaign.

But what we found in that paper, for example, on diffusion of micro-finance, what we found is that it doesn't necessarily work. A lot of these people, who are supposed to be influential, are really not that influential. And if you hit one of these person that you think is influential and you spread information to them, then information goes nowhere. So you would like to find people who are influential. And it's hard to do.

And so that's where the gossips idea came up just to find a way to find these influential people. So what's the idea of gossips? That's the paper, or the first paper you read. Yeah?

AUDIENCE: Identify people who would be good at spreading information by just asking people who would be good at spreading information?

ESTHER DUFLO: Exactly. So it's asking in the community. Finding a few people and asking them, well, who do you-- if I have a piece of information, who do you think I should give it to? And the reason why? So that seems pretty straightforward-- just ask people.

We know that community members have information. For example, in a paper by Ben and Vivi and Rema and Abhijit, we know that they are. They know who is poor, for example. So they know some stuff about their village. We know that they are good at identifying people who are productive.

So that's a paper by Ben Roth, Natalia Rigol, and Reshmaan Hussam, who is basically suggesting that people knew, in their community, who would make good use of 1,000 rupees or 10,000 rupees of a loan-- of a grant. And they know better than we could by trying to run a regression, do machine learning, or whatever.

So that would be that first order. That's not a crazy thing to say. But the thing with being influential in a network, that might be harder. Because getting a full view of your network, people don't have. For example, I know who my friends are. I might know who the friends of my friends are. But I don't know who the friend of my friend of my friends are.

And you would think, in order to know who is influential in a network, if that's related to your central location in a network, you would be quite lost. Especially as many of you have mentioned, networks get divided. There is some segregation in the network. So you might only have the idea of about half the village at best.

So why would they know? So one way to think about this is to say, well, what does it mean to be influential in the network? So in a diffusion sense, someone wanted a graph-- someone, one of you, who commented, wanted to see a graph of centrality. So here is one.

So here is what it means to be influential in a diffusion sense. If you have a model where people simply pass information, with some probability, to the people in their edge, and the process is repeated for a number of period. So this is, if you have a piece of information, you'll pass it half the time, let's say, and for four periods.

So first I give information to them. Then they give it to one of their two friends. Then the process is done again. He gives it to another friend. And this one gives it to two of their friends. And then they, again-- that continues again. And then this is over. And I count, in expectation, how many people, in that, have learned it from them.

So that's diffusion centrality. Here is another example of someone who is a little bit more remote here. So after four periods, in expectation, only 6% have heard the news.

So diffusion centrality is the total expected number of times information, starting at point I, has reached everybody else. So it's the probability of passing the information times each of the links to the power of the number of periods and then summed up.

It's related to other measure of centrality you might have heard. For example, people who have-- if there was only one period, it would be proportional to degree-- your number of friends. If there was an infinite number of period, it would become eigenvector centrality. And for any number of periods, if the process die out after a few period of transmission, people get tired of conveying this particular piece of news, then it's going to be somewhere in between the two.

So the question now becomes more precise. It's whether we think that, despite having a fairly poor representation of the network architecture, people might be able to identify people who have high DC.

First of all, in theory, we could think that hitting people with high diffusion centrality would be effective to diffuse information. As it turns out, in practice that's true as well. So for example, Mushfiq Mobarak, Lori Beaman, and Ariell Reshef have a paper, where they are looking at introducing a new agricultural technology in a village. And they show that if they hit people who are eigenvector central, the information circulates faster.

In our paper, our first diffusion paper, where we looked at these kind of seeds that were supposedly influential people, if they in fact are diffusion central, the information circulates and people take up micro-finance. But if they are not, then the information doesn't. So there seems to be a correlation there, as well.

So that seems that if you could hit the diffusion central people, it would be good. But do people have a reason to know that? And the way that they could find out is because, although they don't know the centrality of someone, they already know how many times or they might have an idea of how many times they have heard about that person. So now it's not just hearing a piece of news coming from that person but hearing about that person.

So suppose that there are some news, like I got a new goat or might change jobs, and the probability that this gossip circulates is passed from one node to another. And the only thing people can keep track of is how many times they've heard that news. And if the news is of interest, then it will be circulating by many edge. And people are more likely to hear it if the original person, about whom the news is, has more friends, who have found out about the news, and themselves have more friends to whom they can spread this news.

So the formula is different than the formula for diffusion centrality. But it's related. It's now the number of times I've heard about a piece of news. And so the diffusion centrality tracks how the info spread from a given node. And the network gossip tracks how often I hear about an info that originated from other nodes.

So if you compare this formula to the other ones, it's not the same but it's related. And the intuition for why it's related is because, if people have a lot of friends, who themselves have a lot of friends, on the one hand, anything they say will circulate a lot, and, also, any news about them will circulate a lot.

So if you have enough communication period, the two will actually converge to each other and remain very correlated. And in fact, with infinite number of periods, they'll just be the same. They'll eventually converge to be exactly the same.

And the intuition is, one, that people who are popular can convey a piece of news and also pieces of news about them convey. I have heard many times about Arun also means that, when Arun has a piece of news, many people have heard it.

You can see that it's not the same object. It's I have heard about him versus he has reached a lot of people. But the two are correlated, because they are related to the information passing from one edge to the other.

So that's the idea of gossips. And so what this suggests, if that theory is correct, is that, first of all, people should have relative agreement about who the central people are. There should be quite a bit of consensus, because they are the same within the network. So you can introspect whether, in your class, it's the same person. If you have a piece of news you don't want to spread, who you should go see and who you should not tell it and vice versa.

And that if an information gets transmitted to one of these people, it should, in fact, spread. Then you could even have an advantage over the properly calculated value of eigenvector centrality, of diffusion centrality, because, in addition, you ask the question, who is good at transmitting information.

If you can calculate how many times you've heard about them-- in addition, you might know that these are gregarious people. Who like to talk a lot. And so that is something that's not captured by this very simple model, where everyone has the same Q, but could be incorporated by someone about them.

So you could do even better if you can do this simply. If the simple exercise of counting the piece of news is, in fact, going to give you a good sense of people, places, and network, you can do even better by adding other things you end up knowing about them. So that's the idea.

So on Wednesday, we are going to see how that fares. And then how that compares with other things that one could also do in one context. And think also a bit more methodologically about one even answer these questions. And then we'll shift to, given this model of demands, thinking about the mess that health care supply becomes.

Thank you so much.